

WHAT IS CLAIMED IS:

1. A mixed potential electrochemical sensor for the detection of gases comprising:

a ceria-based electrolyte having a surface for exposing to the gases to be detected;

5 a reference wire electrode and a sensing wire electrode extending through the surface of the electrolyte and fixed within the electrolyte as the electrolyte is compressed and sintered.

2. The sensor according to Claim 1 wherein the reference wire electrode is Pt.

3. The sensor according to Claim 1, wherein the sensing wire electrode is Au or Rh.

4. The sensor according to Claim 1, wherein the ceria-based electrolyte is $\text{Ce}_{1-x}\text{A}_x\text{O}_{2-x/2}$, where $0 \leq x \leq 0.25$ and A is selected from Y, Sc, or Lanthanide.

5. The sensor according to Claim 4, wherein the reference wire electrode is Pt.

6. The sensor according to Claim 4, wherein the sensing wire electrode is selected from the group consisting of Au, Ag, Pd, and Rh.

7. A method for fabricating a mixed potential electrochemical sensor for the detection of gases comprising:

forming a wire reference electrode and a wire sensing electrode, each electrode having a first compressed planar section and a second section depending from the first section;

placing the wire electrodes in a die with the second section of each electrode extending axially within the die;

filling the die with an oxide-electrolyte powder;

pressing the powder with the wire electrodes;

removing excess oxide-electrolyte powder to expose the first compressed planar portion of the electrodes;

extending the first portion of the electrodes axially from the pressed oxide-electrolyte powder; and

sintering the wire-electrodes and the pressed oxide-electrolyte powder to form a ceramic electrolyte base with a reference wire electrode and a sensing wire electrode depending therefrom.

8. The method according to Claim 7, wherein the first compressed planar portion of each electrode is a coil configuration.

9. The method according to Claim 7, wherein the reference electrode wire is a Pt wire.

10. The method according to Claim 7, where the sensing electrode wire is selected from the group consisting of Au, Ag, Pd, and Rh.

11. The method according to Claim 7, wherein the oxide electrolyte powder is $\text{Ce}_{1-x}\text{A}_x\text{O}_{2-x/2}$, where $0 \leq x \leq 0.25$ and A is selected from Y, Sc, or Lanthanide.